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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Koji YAMADA et al.

Art Unit: 1793

Application No.: 10/521,818

Examiner: Yang, J.

Filed: January 21, 2005

Attorney Dkt. No.: 12065-0020

For: METHOD AND APPARATUS FOR RECOVERING PLATINUM GROUP
ELEMENTS (AS AMENDED)

SUPPLEMENTAL RESPONSE AND REQUEST FOR RECONSIDERATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This filing is made in response to the final rejection and the comments made in the Advisory Action of September 24, 2008.

In the Advisory Action, the Examiner continues to insist that a *prima facie* case of obviousness is established by the combination of the teachings of Jones and JP '322. The issue is whether the steps of ascertaining the copper content of the molten slag in the furnace by sampling and analyzing and discharging the molten slag from the furnace based on a particular copper content are obvious.

In rejecting the claims on this point, the Examiner states

JP '322 teaches the relationship between copper content of the molten slag and the recovery rate of Pt (table 1-2 of JP '322)

The Examiner's interpretation of the teachings of JP '322 is fundamentally in error and JP '322 cannot be used as a basis to support the allegation of obviousness.

Tables 1 and 2 of JP '322 do not teach a slag produced at reducing conditions in an electric furnace. A fundamental step of claim 1 is the charging step, wherein a copper source material containing copper oxide, a reductant, a flux, and a PGM-containing substance are charged into a closed furnace, and sinking molten metal of primarily copper and enriching the PGM elements in the sunk molten metal.

JP '322 teaches a process wherein copper oxide is produced in an oxidizing furnace 1 with oxygen blowing into a molten Cu via a lance 2. The data of Tables 1 and 2, strictly speaking, show the recovery rate of PGMs when a molten copper is oxidized to a molten copper oxide by oxygen blowing in an oxidizing furnace. For the Examiner's benefit, an enlarged copy of Figure 1 and Tables 1 and 2 of JP '322 is attached, with annotations regarding the various material flows and English translations of certain terms.

As can be seen from Figure 1, spent catalyst (B), molten Cu (A) and oxygen gas are supplied to the oxidizing furnace. Two output streams emanate from the furnace, molten oxide layer, i.e., copper oxide (D), and molten metal, copper and PGMs (C). Stream C is then cast.

The molten oxide stream D is charged to an electric furnace that also receives a flux and a reducing agent. Two streams emanate from the electric furnace, a slag (F), and molten Cu (E). The molten copper stream E is recycled to the oxidizing furnace in place of stream A in an alternate embodiment discussed in more detail below.

JP '322 describes two examples. Example 1 is the case where a PGM-containing substance of spent vehicle exhaust gas purification catalyst (referred to as "spent catalyst") is added to the molten copper-containing oxidizing furnace. Example 2 is similar to Example 1 except that the charge of molten copper is derived from the electric furnace 3. The results of Example 1 are shown in Table 1 and the results of Example 2 are shown in Table 2.

In Example 1, the spent catalyst is added to the molten Cu in oxidizing furnace 1 and blown with oxygen gas through the lance 2. This produces a molten oxide layer (mainly molten copper oxide) and a residual molten Cu layer in which PGMs are enriched. Referring now to Table 1, the various streams associated with Example 1 are identified by letters. A is the molten Cu charged into the oxidizing furnace 1. B is the spent catalyst, C is the molten metal discharged from the furnace 1, and D is the molten oxide layer mainly comprising Cu oxide discharged from the furnace 1.

In the rejection of November 28, 2007, the Examiner cites JP '322 as teaching that copper content in the molten slag is a result effective variable. To support this, the Examiner refers to Table 1 of JP '322 and notes that 194 ppm Pt exists in stream C along with 200.8 kg of Cu. The Examiner then notes the amount of Pt in stream D and the 97.5 % recovery of PGMs in stream C as compared to stream D.

The problem with this approach is that the Examiner has treated stream D as a slag. In fact, stream D is not a slag, but has 82.5% Cu, which has nothing to do

with a slag that is discharged when the copper content is 3.0% or less as required by the independent claims.

From this, it is clear that Table 1 does not teach that copper content in the slag is a result effective variable since Example 1 of JP '322 does not even speak of a slag as part of the oxidizing furnace operation. What Example 1 and Table 1 show is that PGMs are recovered in the molten Cu during the oxidizing process and that the oxidized molten Cu has minimal PGMs. Again, this is not anywhere near the same as the claimed process, which involves a reduction of copper oxides for the enrichment of PGMs in the molten Cu and control of the discharge of the slag to improve the enrichment process.

Example 2 of JP '322 also fails to support the Examiner's position. In this Example, molten Cu accompanied by PGMs is used as the molten Cu feed material and charged into the oxidizing furnace together with the spent catalyst and blown oxygen. This Example also produces a molten oxide layer (mainly copper oxide) and a residual molten Cu layer in which PGMs are enriched. The molten Cu accompanied by PGMs is obtained from electric furnace 3 shown in the lower portion of Figure 1.

In electric furnace 3, chilled copper oxide obtained from the oxidizing furnace (stream D) is charged together with flux and coke thereby to melt down and reduce the copper oxide. Slag as stream F and molten Cu accompanied by PGMs (stream E) are generated, with stream E being directed to the oxidizing furnace as part of the Example 2 investigation.

Referring now to Table 2, the difference between Table 1 and Table 2 is that in Table 1, stream A is used, which is a molten Cu material that is not enriched with PGMs as is stream E. In Table 2, stream E is used as the feed for the oxidizing furnace. Table 2 shows that there are PGMs in stream E, whereas stream A of Table 1 has no PGMs. Table 2 then compares streams C and D, with the bulk of the PGMs in stream C and stream D containing 81.5% Cu.

Neither Table 1 or Table 2 define the Cu content of the slag of the electric furnace so that there is no recognized relationship between copper content and the slag in terms of a result effective variable.

Moreover, the Examiner cannot say that monitoring the copper content of the metal and copper oxide (streams C and D) produced in the oxidizing process of JP '322 can be used to support the contention that the ascertaining and discharging steps of claims 1 and 4 is obvious. The oxidizing process is not in the least similar to the reducing process of claims 1 and 4. If anything, the electric furnace reducing process of JP '322, wherein a slag and a PGM-enriched molten Cu stream are produced is more akin to the claimed process. Even with this similarity, there is no recognition in JP '322 of a control of the discharge of the slag based on copper content.

Based on the above, the Examiner has made a fundamental error in the interpretation of the teachings of JP '322. This error fatally taints the rejection of claims 1 and 4 under 35 U.S.C. § 103(a) based on the combination of Jones and JP

'322. Put another way, the Examiner does not have a legitimate reason to modify Jones and the rejection is improper for this reason and must be withdrawn.

Accordingly, the Examiner is requested to examine this application in light of this Amendment and pass all pending claims onto issuance.

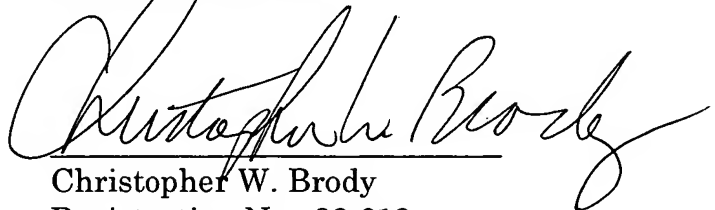
If the Examiner believes that an interview would be helpful in expediting the allowance of this application, the Examiner is requested to telephone the undersigned at 202-835-1753.

Again, reconsideration and allowance of this application is respectfully requested.

Applicants respectfully submit that there is no fee required for this submission.

Please charge any fee deficiency or credit any overpayment to Deposit Account No. 50-1088.

Respectfully submitted,
CLARK & BRODY

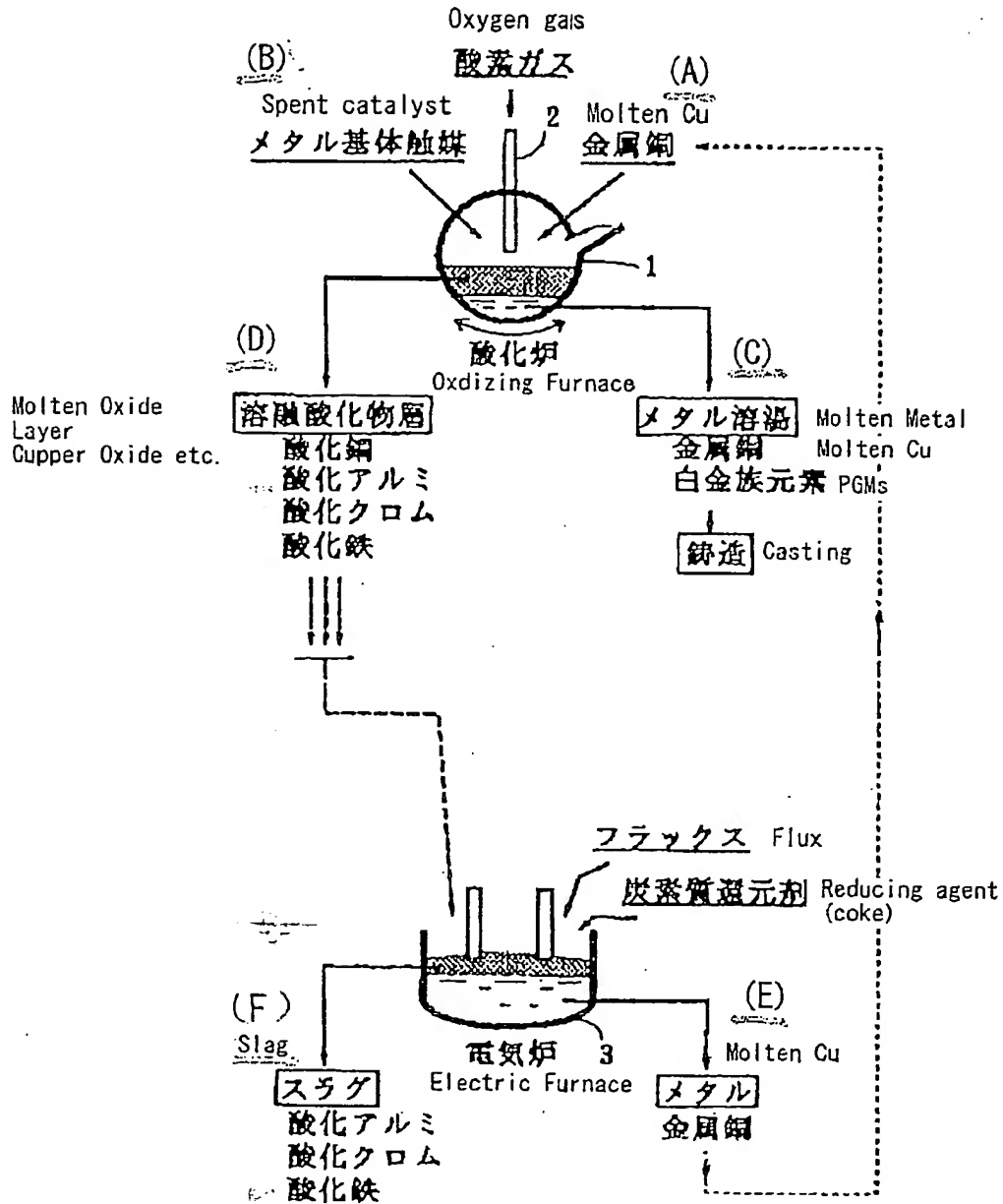


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Docket No.: 12065-0020
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【図 1】



【表1】

	重量 Kg	Cu		Pt		Pd		Rh	
		含有量 %	重量 Kg	含有量 ppm	重量 g	含有量 ppm	重量 g	含有量 ppm	重量 g
装入物									
金属銅 (A)	1002	100	1002	0	0	0	0	0	0
メタル基触媒 (B)	50	0	0	800	40.0	100	5.0	300	15.0
メタル溶湯 (C)	201	99.9	200.8	194	39.0	25	5.0	75	15.1
溶融酸化物 (D)	970	82.5	800.2	1	1.0	<1	0	<1	0
白金族元素回収率 (%)		—		97.5		100.0		100.0	

Recovery rate of PGMs

A B C D

[表2]

	重量 Kg	Cu		Pt		Pd		Rh	
		含有量 %	重量 Kg	含有量 ppm	重量 g	含有量 ppm	重量 g	含有量 ppm	重量 g
装									
入	電気炉還元銅(E)	99	782	1	0.8	0	0	0	0
物	メタル基触媒(B)	0	0	800	40.0	100	5.0	300	15.0
	合計		782		40.8		5.0		15.0
処	メタル溶湯(C)	99.9	195	205	40.0	26	5.0	77	15.0
理	溶融酸化物(D)	81.5	585	1	1.0	<1	0	<1	0
物	合計		780		41.0		5.0		15.0

E

B

C

D